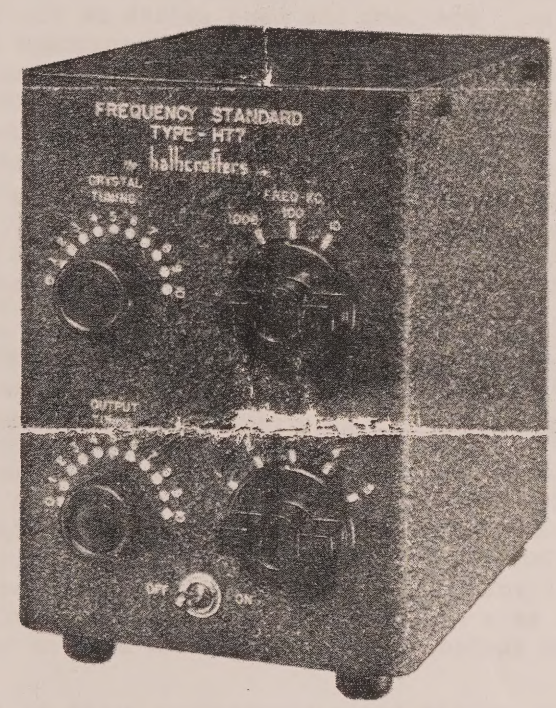
# OPERATING INSTRUCTIONS
# FREQUENCY STANDARD
# MODEL HT7




*the* hallicrafters *inc.*

CHICAGO U.S.A.

0519T739

# HT 7 FREQUENCY STANDARD

Unpack the unit and inspect carefully to determine if any damage has occurred in transit. If so, file claim with the transportation company which handled the shipment.

## OPERATION

The Model HT 7 Frequency Standard is designed to be operated on 110-125 volt 50-60 cycle alternating current. It is suggested that the user connect the HT 7 to a receiver; "A" terminal on Standard to antenna post on receiver and "G" terminal to receiver ground post. After you have become familiarized with the way the unit should be operated, the wire which is connected to the "A" post on the standard can be more loosely coupled to the receiver by twisting this wire around the antenna lead until the most satisfactory amount of coupling has been reached.

1000 KC - Set the Freq.-KC Switch to the 1000 KC position after the OFF-ON switch has been placed in the "ON" position. Now turn the band switch on the Standard to #1 band. The receiver should be adjusted for standard broadcast band coverage during these initial steps of adjustment. With the beat oscillator in the receiver turned on you should be able to hear a strong signal at 1000 KC in the broadcast band and at every 1000 KC throughout the other tuning ranges of the receiver.

The 1000 KC frequency is ground to a tolerance of .05%, and has a temperature co-efficient of about 23 cycles per megacycle per degree centigrade. Obviously, the 1000 KC harmonics should be used only as markers to approximately locate the even 100 KC divisions. For accurate measurements, the crystal switch should be placed in the 100 KC position.

100 KC - Place the crystal switch at the 100 KC position. A signal from the standard will now be heard every 100 KC on the receiver.

NOTE - To accurately adjust the standard the following procedure should be carefully followed: Place the crystal switch at the 1000 KC position. Turn off the beat frequency oscillator in the receiver. Now tune in a broadcast station, or preferably WWV, transmitting on an even 100 KC frequency (600-700-800 KC). Tune in this signal accurately. Place the crystal switch in the 100 KC position. Undoubtedly a beat note will be heard. Now adjust the "Crystal Tuning" control slowly until you have reached zero beat. If the receiver is equipped with a resonance indicator, such as a meter or eye, this adjustment will be more accurately made by watching the pulses of the indicator while exact zero beat is being approached.

In the 100 KC position the crystal has a temperature drift of about 10 cycles per megacycle per degree centigrade. Temperature variations is normal service over several hours may cause frequency variations of approximately 50 parts per million.

The harmonics of the 100 KC oscillator become noticeably weak above 7 megacycles. A harmonic amplifier with a tunable output circuit is provided to raise the output level so that it will be usable through the 30 MC band. By setting the "Band Switch" to positions 2, 3, 4 or 5, and adjusting the "Output tuning" control a point will be found where sufficient output is provided for all checking purposes.

10 KC - With the crystal switch set at the 10 KC position, a multivibrator, locked to crystal frequency, is connected into the circuit. This will provide output signals which will be heard every 10 KC apart between the 100 KC points.

The presence of the 10 KC harmonics allows the standard to be set to zero beat with any domestic broadcast station inasmuch as they are spaced 10 KC apart. It is required by the F.C.C. that broadcast stations remain within 50 cycles plus or minus of their assigned frequency. Most station maintain 5 or 10 cycle deviation as maximum so they constitute accurate checking points. Highest accuracy is, of course, obtained when beating against WWV, but broadcast carriers allow sufficient accuracy for most purposes.

The adjustment screw on the rear of the unit selects the sub-harmonic of 100 KC on which the multivibrator operates. If this control is improperly adjusted, there may be more or less than 9 signals between 100 KC points - that is the signals may be $\frac{100}{8}$ or $\frac{100}{10}$ KC apart - 8 or 10 signals being heard instead of 9. Count the number of 10 KC harmonics between 100 KC points and if you find more or less than 9, adjust this control until 9 signals are heard between the 100 KC markers. This adjustment is originally made at the factory so it is improbable any further adjustment will be found necessary. Once the multivibrator has been locked to the proper sub-harmonic the output will be very stable.

## USES

The HT 7 will be of great help in providing an accurate source of signal energy for receiver alignment purposes. When aligning receivers connect the standard to the receiver as outlined previously; establish the 1000 KC marker positions and then align the receiver accurately from the 100 KC signals it delivers.

With the widespread use of the Electron coupled oscillator for frequency control in amateur transmitters, in addition to the most recent FCC regulations imposing the necessity for accurate frequency checking, the HT 7 fills a needed want. The edges of the various amateur bands can be immediately established roughly by using the 1000 KC signal output. Exact band edge location can then be determined by resetting to the 100 KC output frequency. In the 10 KC position the standard can then be used for frequency measurement purposes by interpolating between dial divisions and the frequency of the standard. Presume for example, that you wish to locate a signal on 7263 KC on the receiver. Set the standard to 1000 KC and locate the band edge at 7000 KC. Then switch the standard to the 100 KC position and count over two 100 KC points. We have now located 7200 KC. Now set to 10 KC crystal position and count over six 10 KC points from 7200. We now have 7260 KC. Log the dial setting for 7260 KC. Now tune over one more 10 KC harmonic to 7270 KC. Let us suppose that 7260 KC came in at 76 on the dial and 7270 KC was heard at 79. This represents a difference of three divisions to cover 10 KC, consequently each KC represents .3 divisions on the dial. To locate our exact frequency of 7263 KC simply move the dial .9 divisions past 76 (the 7260 calibration point) or namely to 76.9.

## HT 7 PARTS LIST

| RESISTOR | | | CONDENSERS | | | |
|---|---|---|---|---|---|---|
| R | OHMS | WATTAGE | C | CAPACITY | | TYPE & VOLTAGE |
| 1 | 5000000 | 1/2 | 1 | .1 | mfd | 200 |
| 2 | 500 | 1/2 | 2 | .1 | " | 400 |
| 3 | 25000 | 1 | 3 | 25 | mmfd | air variable |
| 4 | 2500 | 1 | 4 | .002 | mfd. | Mica |
| 5 | 2500 | 1 | 5 | .002 | " | " |
| 6 | 20000 | 1 | 6 | .002 | " | " |
| 7 | 15000 | variable | 7 | .001 | " | " |
| 8 | 300 | 1/2 | 8 | .01 | " | 400 |
| 9 | 30000 | 1 | 9 | .01 | " | " |
| 10 | 50000 | 1/2 | 10 | .002 | " | Mica |
| 11 | 85000 | 1 | 11 | 10 | mmfd | " |
| 12 | 100000 | 1/2 | 12 | | | |
| 13 | 500 | 1/2 | 13 | 8 | mfd | 350 electrolytic |
| 14 | 15000 | 1 | 14 | 8 | " | 350 electrolytic |
| 15 | 4000 | 10 | 15 | 35 | mmfd | Ceramic |

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